



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
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Surface Water Discharges Section

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Public Notice Fact Sheet
Permit Effective Date –

Perdue Foods, LLC
20621 Savannah Road
Georgetown, Delaware 19947

NPDES No. DE 0000469
State Permit No. WPCC 3235G/74

Permit Renewal Application

Perdue Foods, LLC has requested reissuance of its National Pollutant Discharge Elimination System (NPDES) Permit No. DE 0000469 to discharge treated process wastewaters and treated process area storm water from a wastewater treatment system and storm water run-off (from grassed area) from the property located on Savannah Road in Georgetown, Delaware to Savannah Ditch.

Summary of Requested and Proposed Permit Changes

Perdue requested in the permit application:

- To provide reasonable schedule of compliance for total nitrogen and phosphorus limits.
- To eliminate monitoring and limits for aluminum, copper, and zinc if they do not prove to be toxic.

The Delaware Department of Natural Resources and Environmental Control (DNREC) proposes to reissue the permit with following changes:

1. Implemented 12-month cumulative average annual load limit for Total Nitrogen (TN), based on the TMDL for the Broadkill River Watershed.
2. Implemented daily average load limit for Total Nitrogen (TN) during the months of May through September based on the TMDL for the Broadkill River Watershed.
3. Implemented daily average load limit for Biological Oxygen Demand (BOD₅), Total Phosphorus (TP), and Ammonia based on the TMDL for the Broadkill River Watershed.
4. Added "Schedule of Compliance" to Part I, C. of the permit requiring the permittee to comply with the final effluent limitations and monitoring requirements for Total Nitrogen (TN), Total Phosphorus (TP), and Ammonia no later than fifty-nine (59) months after the effective date of the permit.
5. Revised "Reporting" in Part I.D.2. which requires the permittee to submit results via the Department approved Electronically Generated Discharge Monitoring Report (eDMR).
6. Added a standard condition in Part II.A.2 "Notifications Specific to Manufacturing, Commercial, Mining, and Silvicultural Dischargers".

7. Add a limit for “Whole Effluent Toxicity” and a thirty-six (36) month compliance schedule for achieving compliance with the new limit.
8. Removed limits for zinc.
9. New copper limits based on new standard (Biotic Ligand Model-BLM)
10. Special Condition No. 8 about Storm water Plan has been amended to include the Broadkill TMDL requirements.
11. Added new special condition No. 11 pursuant to 40 CFR part 136 to ensure the use of EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits.
12. Added Special Condition No. 12 which requires monitoring copper BLM parameters and performing a reasonable potential analysis for copper.

Facility Location

This facility is located at 20621 Savannah Road in Georgetown, Sussex County, Delaware.



Activity Description

This facility is a poultry processing plant. Operations include receiving of live poultry and the slaughter, eviscerating, chilling, and packaging of fresh poultry followed by shipment to northeast markets. The facility is designated a **major** facility as rated using the “NPDES Permit Rating Work Sheet.”

Statutory and Regulatory Basis

The Delaware Department of Natural Resources and Environmental Control (DNREC) proposes to reissue Perdue Foods, LLC a NPDES permit to discharge wastewater subject to certain effluent limitations identified in the permit. Section 402 of the Federal Clean Water Act of 1977, as amended and 7 Del. C., Chapter 60 provides the authority for NPDES permit issuance. Regulations promulgated pursuant to these statutes are the regulatory basis for permit issuance.

Receiving Stream Classification

The applicant has two outfalls to Savannah Ditch, a freshwater, non-tidal stream. Savannah Ditch discharges to Ingrams Branch which discharges to Diamond Pond, then into the Broadkill River which empties into Zone 6 of the Delaware River. The designated uses are Industrial Water Supply; Primary Contact Recreation; Secondary Contact Recreation; Maintenance of Fish, Aquatic Life, and Wildlife; and Agricultural Water Supply.

Low Flow Waters

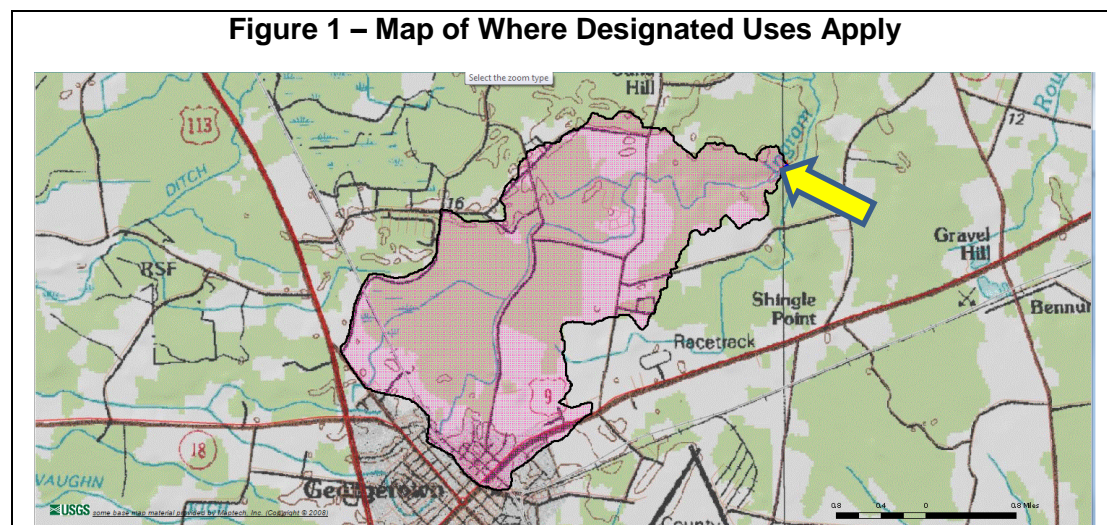
The DeSWQS provide that “designated uses” apply “at the closest downstream point where uses could reasonably be expected to occur”:

8.0 Criteria for Low Flow Waters

8.1 A low flow water is one in which the 7Q10 freshwater inflow is less than 0.1 cfs. The following criteria shall apply to discharges into low flow waters:

8.1.1 Where information is available for the receiving water which indicates that, because of low flow, it would not support designated uses, then numeric criteria shall not apply. The numeric criteria shall then apply at the closest downstream point where uses could reasonably be expected to occur.

From the USGS watershed mapping tool,¹ the following figure shows where 7Q10 flows are greater than or equal to (\geq) 0.1 cfs.



¹ <https://streamstats.usgs.gov/ss/>

From the same USGS tool, the following table shows basin characteristics before and at where designated uses apply.

Table 1 – Basin Characteristics Report		
Location	Before & at stream junction where 7Q10 stream flow is ≥ 0.1 cfs	
NAD27 Latitude	38.7235	38.7236
NAD27 Longitude	-75.3444	-75.3442
NAD83 Latitude	38.7236	38.7237
NAD83 Longitude	-75.3440	-75.3438
Parameter	Value	Value
Area in square miles	3.65	5.66
Average basin slope, in percent	0.47	0.5
Percent Of area covered by forest	17.5564	24.856
Impervious area, in percent, NLCD 2001	4.1531	3.6507
Hydrologic soil type A, in percent	14.0421	14.7736
Wetlands and Waterbody storage, in percent	1.8651	1.3118
7Q10, from USGS regression equation	0.036	0.131

The equation below was used to calculate 7Q10 flows in the last line of the table above.

<p>Equation 1 – USGS Regression Equation for Calculating 7Q10 Flows²</p> $7Q_{10} + 0.2 = 0.269A^{0.887} (F + 10)^{-0.375} (S_a + 10)^{0.522} (S_d + 10)^{-0.640}$ <p>A = Drainage area, in square miles, F = Forest cover (F) area, as percent of the total drainage area Sa = Type A soils area, as percent of the total drainage area Sd = Type D soils, as percent of the total drainage area</p>
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Description of Discharge

The site has two discharges, Outfalls 002 and 004, to Savannah Ditch. Outfall 002 consists of discharge from the process wastewater treatment system.

Process waste streams include process wastewaters from first processing operations (receiving, killing, scalding, picking), second processing operations (evisceration, chilling), and further processing operations (cutup, boneless, thin slice); plant sanitation wastewater; sanitary wastewater, boiler blowdown (0.035 mgd); process area storm water; and feed mill boiler blowdown (0.003 mgd) from the Perdue Feed Mill in Bridgeville.

Storm water from the process area is collected in a stormwater pond (7 MG capacity) and then pumped to

² Page 9, Equation (2) 9 under “Eastern Shore Region”, “Low-Flow Characteristics of Streams in Maryland and Delaware”, By David H. Carpenter and Donald C. Hayes, U.S. Geological Survey, Water-Resources Investigations Report 94-4020, <http://pubs.er.usgs.gov/publication/wri944020>

anaerobic lagoons. This stormwater runoff is from the following areas: processing building roofs, live hold area, offal area, yard wash down, refrigerated box trailer parking pads, truck wash, trailer drippings, and driveways.

Storm water from the live haul scale, vehicle refueling area, and raw waste lift station is collected in a smaller stormwater pond (0.136 MG capacity), then pumped to the WWTP, and then discharged through Outfall 002.

The wastewater treatment system consists of: screening, anaerobic lagoons, activated sludge (2-cell parallel aerobic/anoxic system), chemical precipitation using alum for phosphorus removal, clarification, and ultraviolet (UV) disinfection. Sand filtration prior to the UV disinfection is not used because the plant meets the TSS permit limits. Sanitary wastewater is treated in a batch aerobic treatment system (sequence batch reactor – SBR) and is then pumped to the ultraviolet disinfection unit. Waste activated sludge from the treatment facility is aerobically digested, gravity thickened, dewatered by belt filter press, and then hauled by a contractor for ultimate disposal by land application.

Outfall 004 consists of stormwater from a grassed non-process area located next to the vehicle refueling area. This stormwater is discharged without treatment.

Proposed Effluent Limitations

DNREC has examined the application and proposes to reissue the applicant's permit for a period of five years, subject to the effluent limitations and monitoring requirements on the attached copy of the draft permit. Following are the bases for the proposed limitations.

Bases for Effluent Limitations for Outfall 002

The following table outlines the bases for the proposed effluent limitations for Outfall 002.

Table 2 – Bases for Effluent Limits and Monitoring							
Outfall	Parameter	Lim/Mon.	Water Quality-Based ¹	Technology-based			
				DRBC ²	Effluent Limitation Guidelines ⁵	Performance-Based ³	RGCWP ⁴
002	Flow	Limit				✓	
	pH	Limit					✓
	BOD ₅	Limit	✓				
	Total Suspended Solids	Limit			✓	✓	
	Oil & Grease	Limit				✓	
	Total Nitrogen	Limit	✓				
	Ammonia (as N)	Limit	✓		✓		
	Total Phosphorus (as P)	Limit	✓				
	Aluminum	Limit	✓				
	Hardness	Monitoring	✓				
	Enterococcus	Limit	✓				
	Biomonitoring	Limit	✓				✓
	"Free From ... "	Limit	✓				

Basis for Effluent Limits and Monitoring Table Notes:

1. State of Delaware Surface Water Quality Standards (**SWQS**), as amended July 11, 2004.
2. Delaware River Basin Commission – March 2005 Water Code
3. Performance-based limits are based on the provisions of 40 CFR 122.45(b)(2)(I).

4. §8.03(b), “Effluent Limitations Based on a Practicable Level of Pollutant Removal Technology”, of the State of Delaware Regulations Governing the Control of Water Pollution (**RGCWP**), as amended May 14, 2003.
5. Final Effluent Limitations Guidelines and New Source Performance Standards for the Meat and Poultry Products (MPP) Point Source Category were published in the Federal Register on September 8, 2004 and promulgated in the Code of Federal Regulations at 40 CFR Part 432. Subpart K - Poultry First Processors applies to the discharges from this facility.

Table 2 below provides a comparison of the current Outfall 002 limits with the 40 CFR Part 432, Subpart K - Poultry First Processors concentration limits and mass limits derived using the long term average (LTA) flow of 2.00 mgd reported in the permit application. Selected limits for the proposed permit are highlighted in bold type.

Table 3 – Comparison of Effluent Guideline Derived Limits with Current Permit Limits.

Parameter	Daily Average				Daily Maximum			
	Concentration Limit (mg/L)		Mass Limit (lbs/day)		Concentration Limit (mg/L)		Mass Limit (lbs/day)	
	Current Permit	40 CFR 432 Subpart K	Current Permit	40 CFR 432 Subpart K	Current Permit	40 CFR 432 Subpart K	Current Permit	40 CFR 432 Subpart K
BOD ₅	11.3	16	188.0	266.9 ¹	22.5	26	375	433.7 ¹
TSS	20	20	333.6	333.6 ¹	30	30	500	500.4 ¹
O&G	7.5	8.0	125.0	133.4 ¹	11.3	14	188	233.5 ¹
NH ₃ – N	4.0	4.0	66.7	66.7 ¹	8.0	8.0	133.4	133.4 ¹

¹ Based on 40 CFR Part 432, Subpart K concentration limit and LTA flow of 2.00 mgd reported in Permit Application.

Oil and Grease Limits

For O&G, the daily average and daily maximum concentration limits in the current permit are lower than the 40 CFR Part 432, Subpart K concentration and mass limits and therefore will be retained. Considering the very low variability in the monitoring results, the permit reduces monitoring frequency to “one grab sample taken per sampling day”.

TSS Limits

The 40 CFR Part 432, Subpart K daily average concentration and mass limits and daily maximum concentration and mass limits are same as current permit. Therefore, the current permit’s concentration and mass limits for TSS are retained.

Broadkill River TMDL-based Limits

The Broadkill River TMDL Regulation and TMDL Analysis Document (Tables 3 & 4 on pgs. 6-1 & 6-2) establish daily Waste Load Allocations (WLAs) for 5-day Biological Oxygen Demand (BOD₅), Ammonia (NH₃), Total Nitrogen (TN), Total Phosphorus (TP), and Enterococcus. The following Table summarizes WLAs for Perdue in the watershed.

Table 4 – Broadkill River NPDES Daily WLAs		
Parameter	Concentrations	Loads
BOD ₅ (mg/L)	10 (mg/L)	166.8 (lbs/day)
NH ₃ (mg/L)	1 (mg/L)	16.7 (lbs/day)
TN (mg/L)	7 (mg/L)	116.8 (lbs/day)
TP (mg/L)	0.5 (mg/L)	8.34 (lbs/day)

Enterococcus	100 (#/100mL)	7,570,000,000 (#/day)
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Daily maximum values can be higher or lower, as long as the Long Term Average (LTA) complies with the Broadkill WLAs.

The EPA's "Technical Support Document for Water Quality-based Toxics Control"³ provides a procedure to calculate limits that account for daily variability and still meet the LTA requirements of the TMDL. Applied to BOD5, TN, and TP limits here, that procedure is

1. Determine whether the data can be described by a normal or log-normal distribution.
2. Calculate a Coefficient of Variation (CV) for the data.
3. Use the Broadkill WLA as the "Average Monthly Limit" (AML) and as the LTA of the data distribution.
4. Calculate the "Maximum Daily Limit" (MDL) as the 99th percentile of that distribution, CV, and LTA.
5. Used the load MDLs to calculate the maximum daily concentration limits, using
(Load in lbs/day) = (Flow in mgd) x (Conc. in mg/L) x (8.34 lbs/gal. water density)

Exceptions are that the enterococcus MDL is based on the WQS and NH3 MDL is based on worst-case acute criterion (See additional discussion below).

Under the headings below for BOD5, TN, and TP,

- The first Figure shows how well normal and lognormal distributions (shown as cumulative frequencies) fit Perdue's data, from 1 day (24 hour) composite samples taken weekly. In those Figures, "MLOC" is the monitoring location; "MLOC = 1" means "gross effluent value at the discharge".
- The second Figure shows the load MDLs, for both normal and lognormal distributions, for the Broadkill WLAs.

For all three parameters,

- The log-normal distribution describes Perdue's data better than the normal distribution, and
- Load MDLs in the proposed permit are based on log-normal distributions of the data.

BOD₅

Based on the TMDL for the Broadkill River Watershed allocation for this facility, a daily average load limit of 166.8 lbs/day is proposed for BOD5. Proposed daily average and maximum load limits are more stringent than the 40 CFR Part 432, Subpart K mass limits. The daily load is used to calculate the limits concentrations based on 2.0MGD design flow capacity as follows:

Concentration, mg/l = (load, lbs/d)/(design flow, mgd * 8.34)

³ http://water.epa.gov/scitech/swguidance/standards/handbook/upload/2002_10_25_npdes_pubs_owm0264.pdf, Appendix E.

Figure 2 – Describing Perdue's 001 BOD5 Data with Normal and Log-normal Distributions

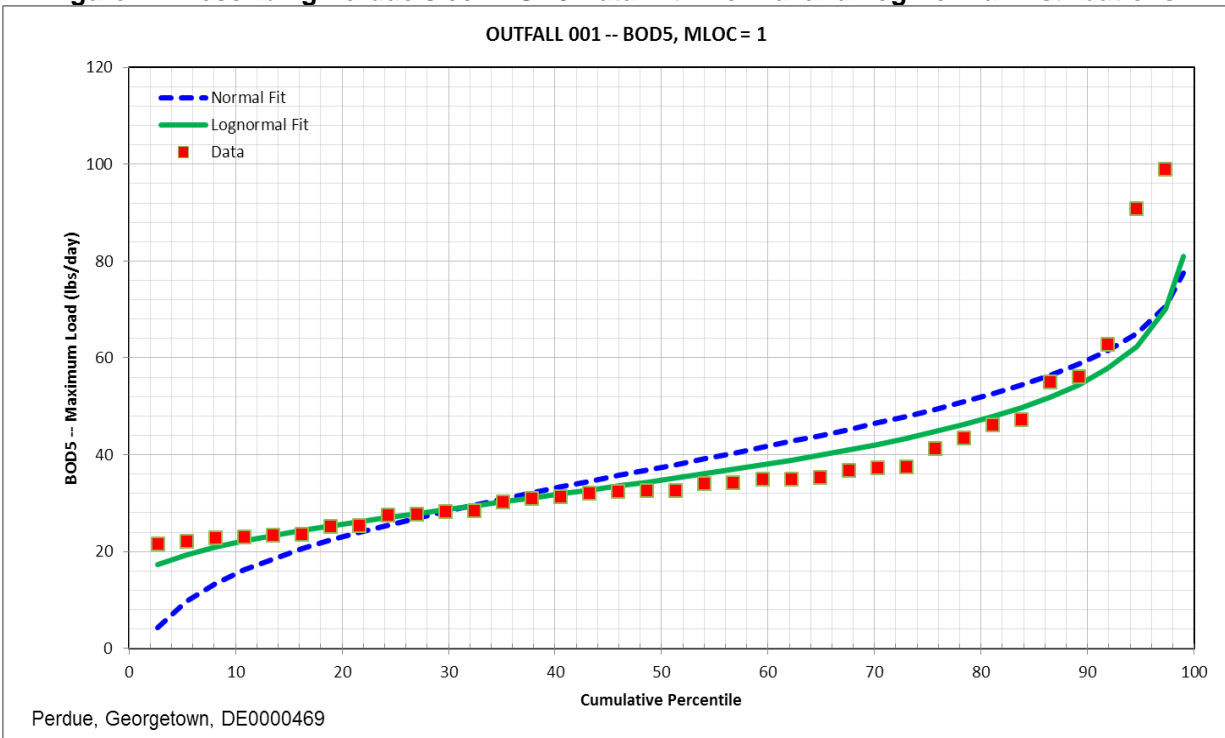
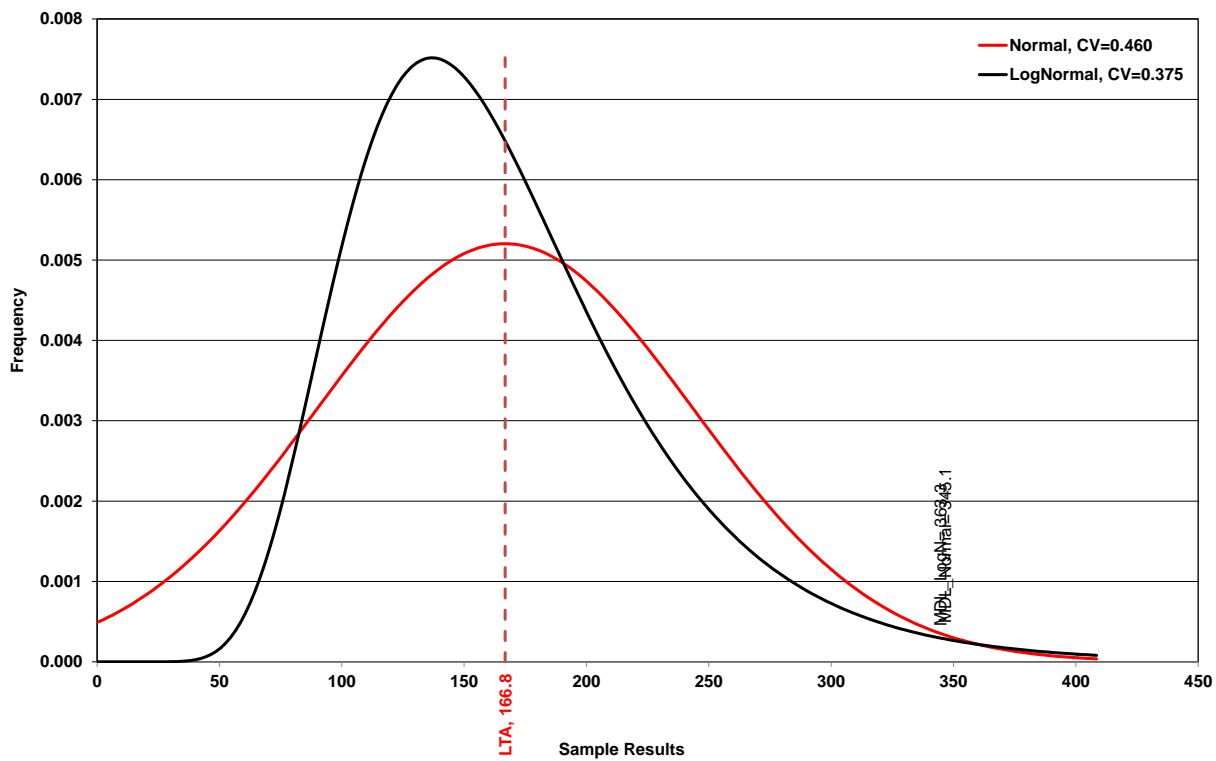


Figure 3 – BOD5, Maximum Daily Load (MDL) Limits



Total Nitrogen (TN) Limits

The TMDL for the Broadkill River Watershed specifies a WLA of 116.8 lb/day for TN for this facility. This WLA has been implemented in the permit as a moving 12-month cumulative average load limit of 42,632 pounds. Additionally, a daily average load limit of 116.8 lb/day for May 1 through September 30 is proposed based on the TMDL; the MDL is 361.3 lbs/day. The effluent limitations for TN, along with TP and Ammonia, are proposed to become effective 59 months after the permit effective date. The proposed permit includes a schedule of compliance for meeting the final effluent limitations, and requires the permittee to submit a report on an annual basis outlining progress made towards compliance with the final effluent limitations and the interim milestones included in the compliance schedule.

Figure 4 – Describing Perdue's 001 TN Data with Normal and Log-normal Distributions

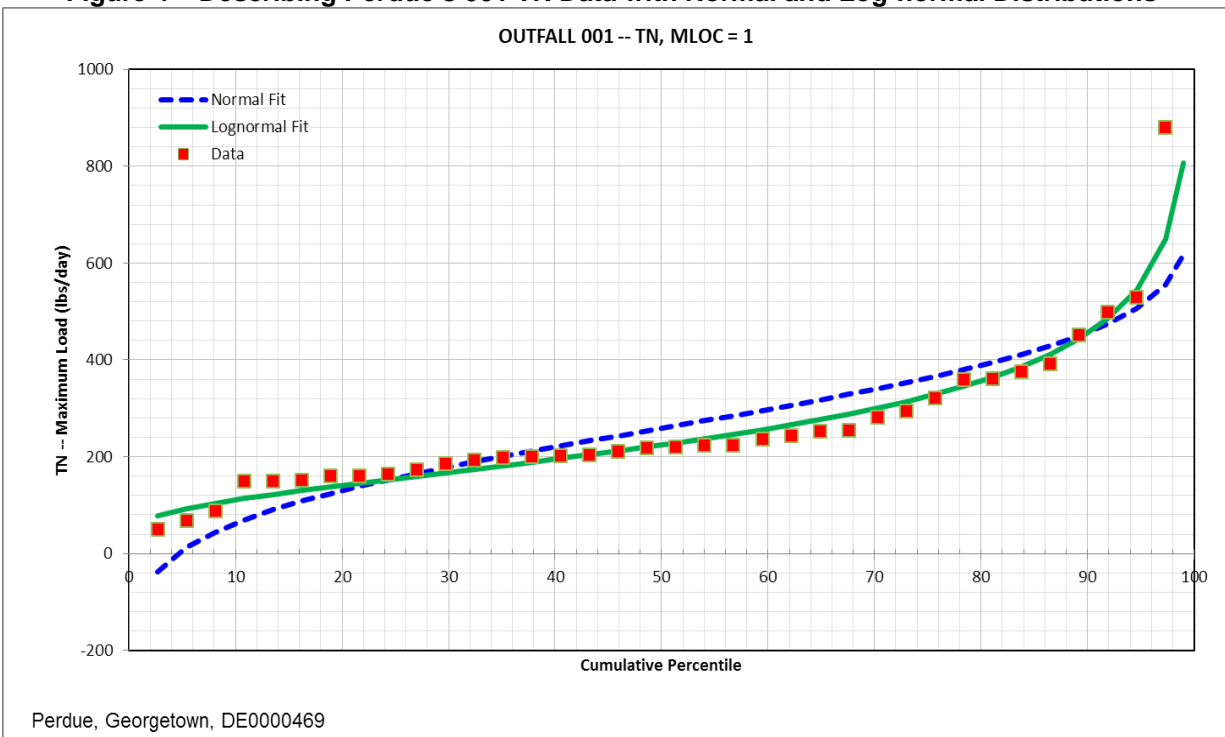
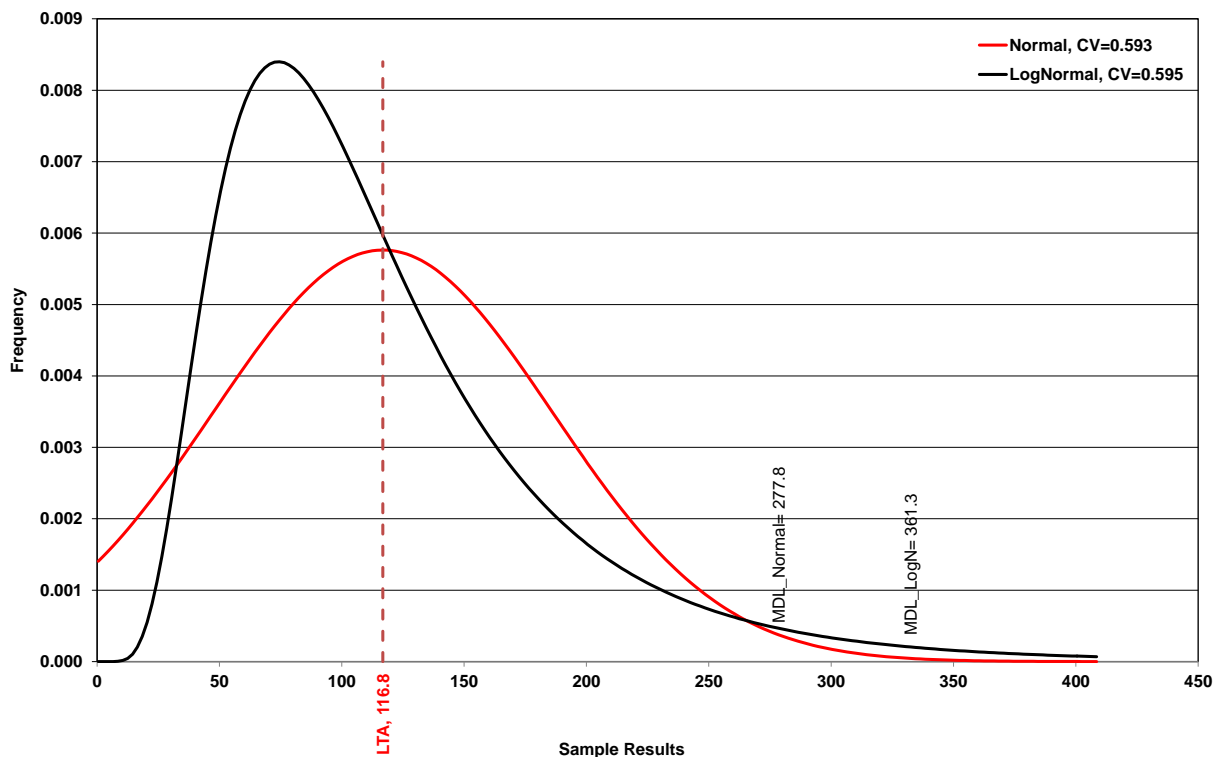


Figure 5 – Total Nitrogen, Maximum Daily Load (MDL) Limits



Total Phosphorus (TP) Limits

Based on the TMDL for the Broadkill River Watershed allocation, a daily average load limit of 8.34 lb/day is proposed for fifth year of the permit. The MDL is 19.4 lbs/day.

The permit does not include daily TP concentration limits. The disincentive for TP concentration limits is that aluminum compounds are often used to precipitate TP, with more and more aluminum needed per TP removed, to achieve very low TP concentrations. In other words, TP concentration limits could contribute to an aluminum (not a TMDL parameter, but limited in the permit) problem if the site has to over treat to achieve TP concentrations.

Figure 6 – Describing Perdue's 001 TP Data with Normal and Log-normal Distributions

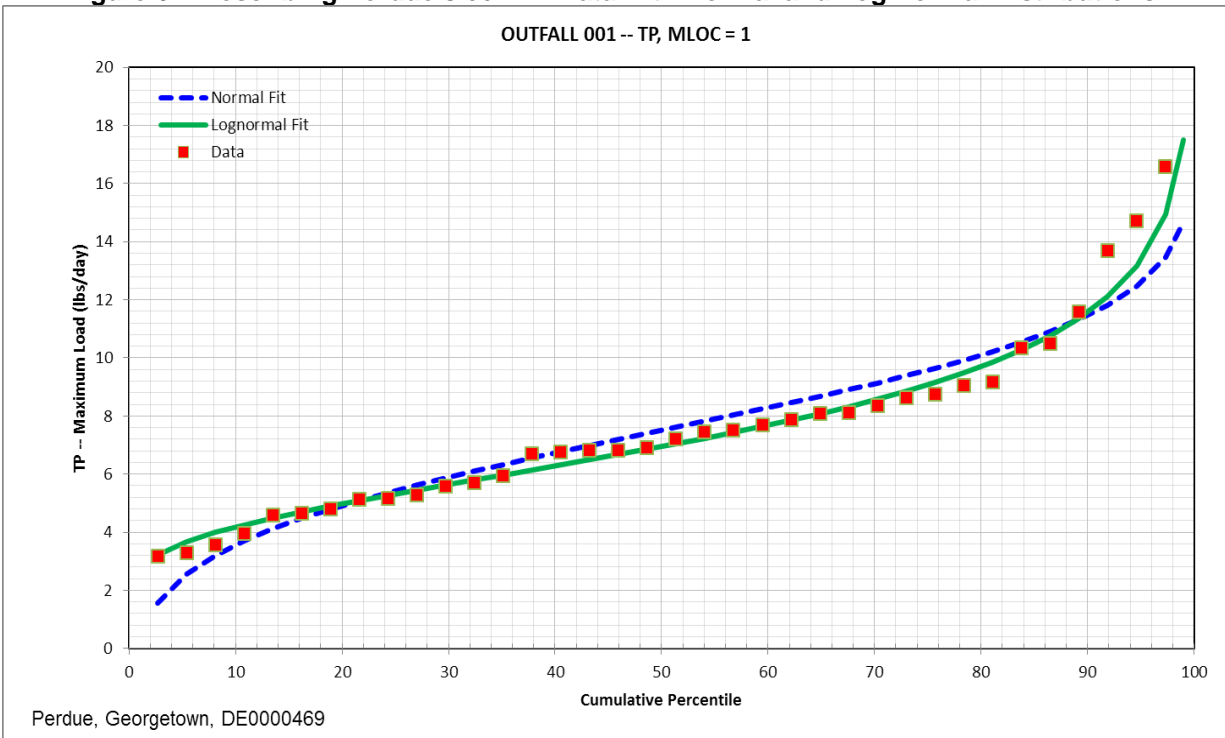
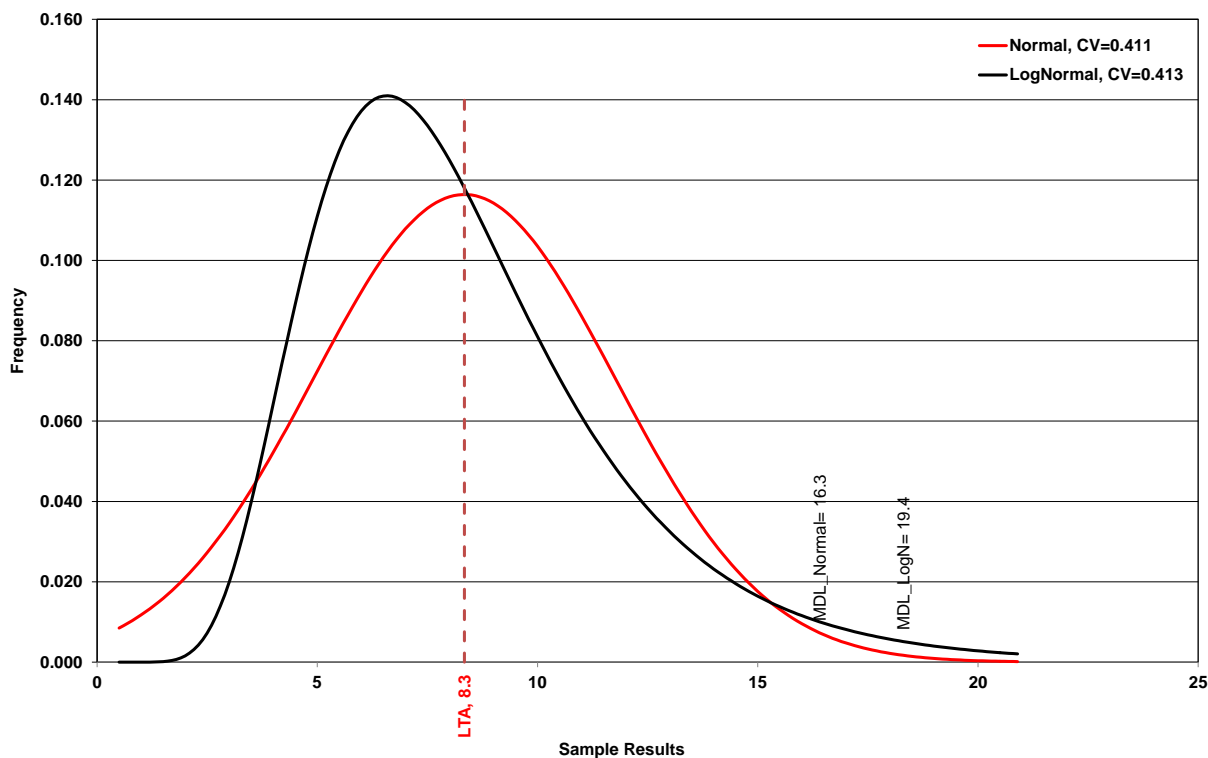


Figure 7 – Total Phosphorus, Maximum Daily Load (MDL) Limits

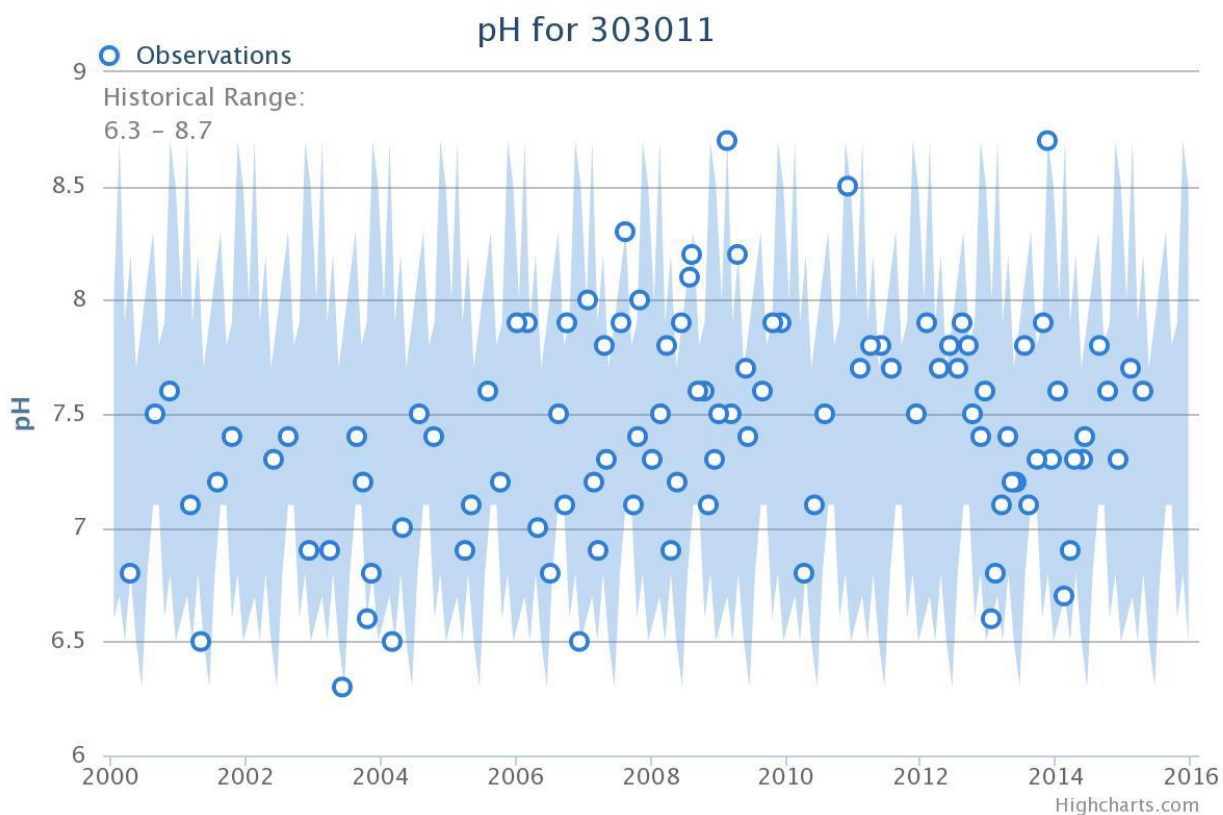


Ammonia Limits

Based on the TMDL for the Broadkill River Watershed allocation for this facility, a daily average load limit of 16.7 lb/day is proposed, effective at the beginning of the fifth year of the permit. Proposed daily average and maximum load limits are more restrictive than the 40 CFR Part 432, Subpart K mass limits.

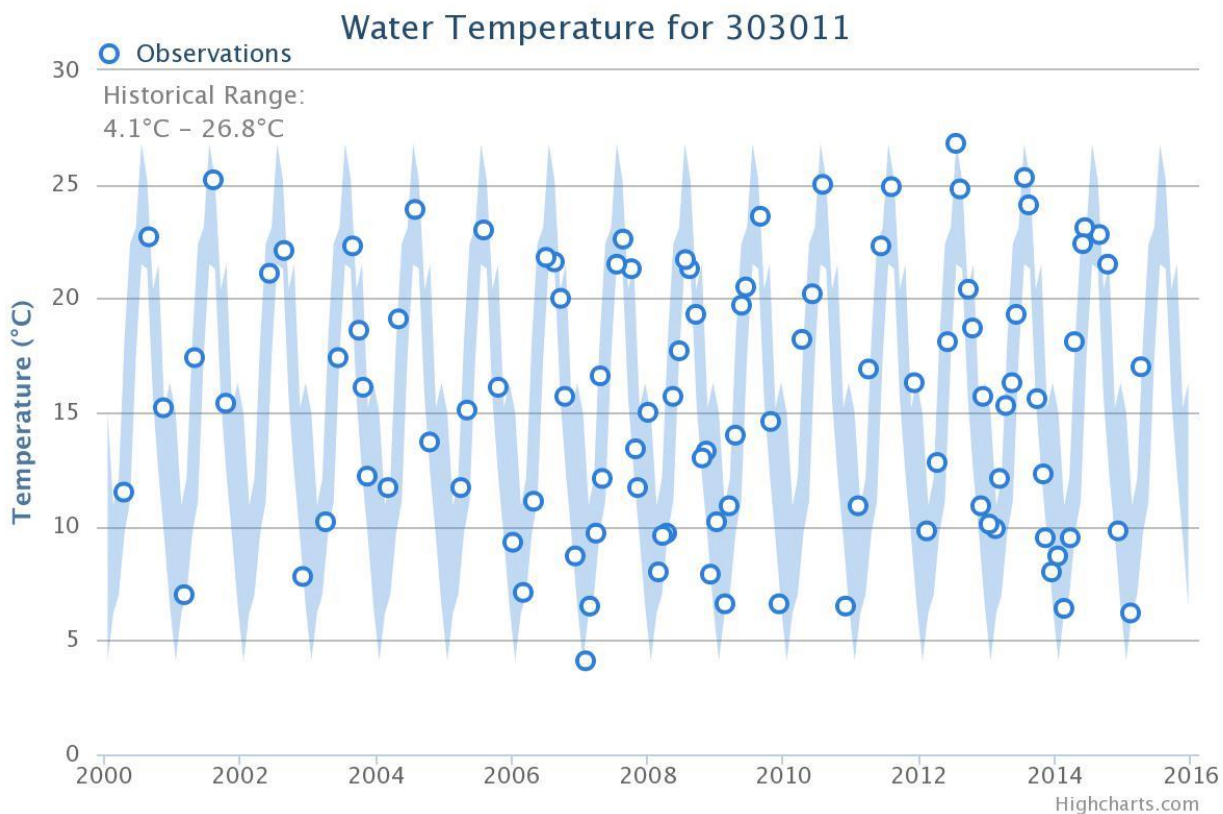
Using the same calculations as for BOD5, TN, and TP, a 99th percentile-based MDL for NH3 would be 5.6 mg/L. However, NH3 can have short term toxicity. The State of Delaware Surface Water Quality Standards⁴ (SWQS) have criteria for NH3 for acute (i.e., 1 hour exposure) and chronic (4-day exposure) toxicity. The acute NH3 criterion (aka the “criteria maximum concentration or “CMC”) is calculated based on pH. The chronic NH3 criterion (aka the “criteria chronic concentration or “CCC”) is calculated based on both pH and temperature.

To determine reasonable pH and temperature ranges to evaluate the potential for NH3 toxicity, the following Figures show historical ranges for instream pH & temperature at STORET Station. 303011 in Ingrams Branch.⁵ At least in Perdue’s case, that is closer to conditions where designated uses will apply, as discussed under **Low Flow Waters** above.

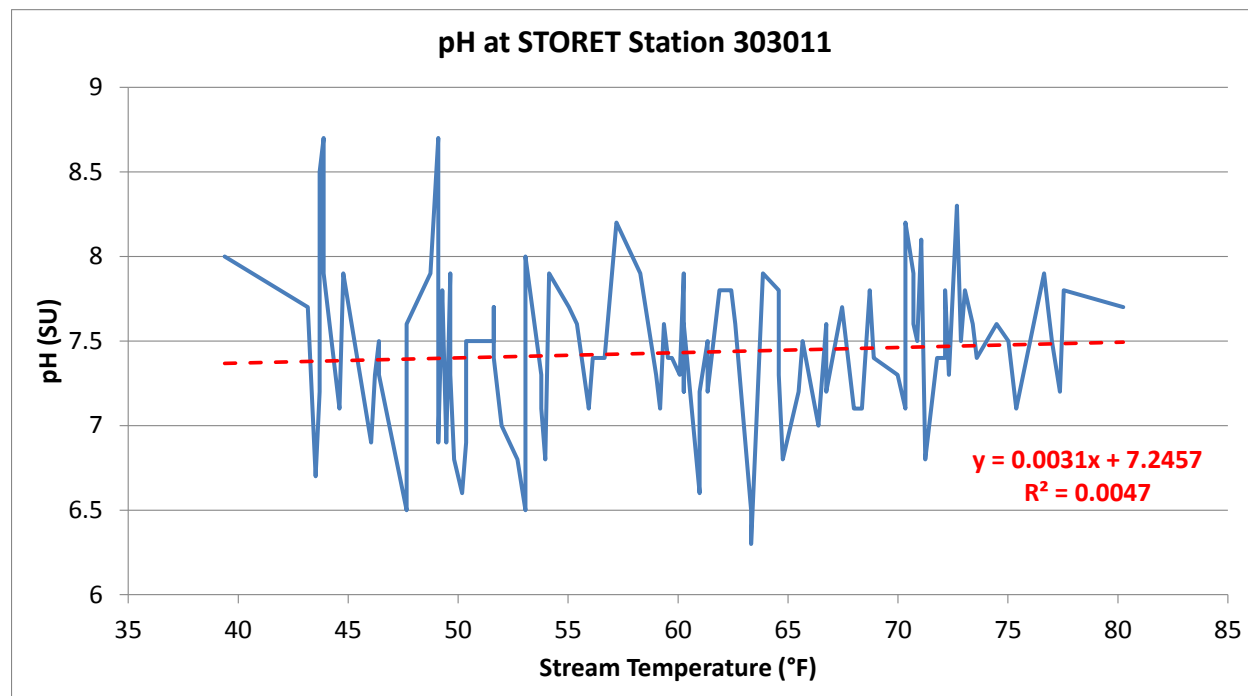


⁴ <http://www.dnrec.delaware.gov/swc/wa/Pages/Watershed%20Assessment%20Surface%20Water%20Quality%20Management.aspx>

⁵ <http://demac.udel.edu/waterquality/>



4.1 – 26.8°C is 39.4 – 80.2°F. The Figure below shows instream pH vs. temperature. R^2 in the Figure below is a measure of the correlation of pH with temperature. $R^2 = 1.0$ would be perfectly correlated; $R^2 = 0.0$ means “no correlation at all”, i.e., pH and temperature are completely independent of each other.



The NH₃ CMC becomes stricter as pH increases. The NH₃ CCC becomes stricter as both pH and temperature increase. As a worst case scenario, the historical stream maximum pH = 8.7 SU was used to calculate the NH₃ CMC of 2.2 mg/L, which is included in the permit as the maximum daily NH₃ limit. Considering the Figure above, temperature & pH conditions will not coincide long enough (4 days) or often enough (more than once per three years) to get a CCC that is stricter than the CMC.

Enterococcus Limits

The limits in the current permit, 185 col/100 mL for daily maximum and 100 col/100 mL for daily average have been retained as they are consistent with the requirements of Broadkill TMDL. The TMDL requirement for enterococcus is stated as a load. The permit will continue to require concentration limits only, since the enterococcus load TMDL requirement is just calculated as

$$\text{Load} = (\text{Enterococcus WQS concentration}) \times (\text{Discharge Flow Limit}) \times (\text{Units Conversion Factors})$$

The same equation, with values and units, is shown below.

Description	Load	Enterococcus WQS Concentration	Units Conversion Factor	Flow Limit	Units Conversion Factor	Units Conversion Factor
Equation and Values	7,570,000,000 =	<u>100</u> x	10	x <u>2</u> x	3.785	x 1,000,000
Units	CFU/Day	CFU/mL	(100s of mLs)/Liter	mgd	liters/gallon	gpd/mgd

For permit compliance reporting, the double-underlined values above would be replaced with actual monitoring results.

Reasonable Potential Analysis and Water Quality-based Limits for Aluminum, Copper, and Zinc

Review of data (last 5 years) indicates the effluent data for aluminum has frequently been above the calculated water quality-based limits until August, 2017. Since Savannah Ditch is an effluent-dominated stream, there is reasonable potential for the Outfall 002 discharge to cause exceedances of De. SWQS for aluminum.

The “reasonable potential analysis” (RP) checks if pollutant concentrations may cause or contribute to exceedances of water quality requirements, and calculates potential limits, based on the procedures recommended in the “Technical Support Document for Water Quality-based Toxics Control”, U.S.E.P.A., Office of Water (EN-336), EPA/505/2-90-001, PB91-127415, March, 1991.

Note that the permit effective on August 1, 2006 includes final limits for aluminum, copper and zinc on page 6, shown in the Table below.

Table 5 – Limits in NPDES Permit DE0000469 effective August 1, 2006.		
Parameter	Average Limit (ppm)	Maximum Limit (ppm)
Aluminum	0.07	0.14
Copper	0.0026	0.0051
Zinc	0.025	0.049

Those limits are based on the information in the rightmost column in the table below.

Table 6 – Values Used for Reasonable Potential Analysis		
Parameter	Updated Values	August 1, 2006 Values
Effluent water hardness	329 ppm as CaCO ₃	36 ppm as CaCO ₃
Ambient water hardness	33 ppm as CaCO ₃	60 ppm as CaCO ₃
Upstream 1Q10 river flow at 002	0.0 cfs	0.007 cfs
Upstream 7Q10 river flow at 002	0.0 cfs	0.011 cfs
Upstream 1Q10 river flow where “designated uses” apply	0.089	N/A
Upstream 7Q10 river flow at 002 where “designated uses” apply	0.131	N/A
Effluent flow	3.09 cfs (=2.0 mgd)	3.09 cfs (=2.0 mgd)

The Reasonable Potential analysis below is based on the updated values in the table above. In short, improved access to data and analysis tools, as discussed below, make the updated values much more reliable than the August 1, 2006 values.

For example, instream water hardness for EPA and USGS ambient monitoring is accessible via <http://waterqualitydata.us/portal/>. The following table summarizes the average instream water hardness⁶ for surface water monitoring stations within 20 miles of the Outfall 002 location (latitude = 38.702172 and longitude = -75.382675, in decimal degrees)

Table 7 – Average Surface Water Hardness at Monitoring Stations	
Stream	44.6
BRIDGEVILLE BRANCH AT BRIDGEVILLE, DE	53.2
BUCKS BRANCH AT BUCKS BRANCH ROAD NEAR ATLANTA, DE	41.6
BUCKS BRANCH AT CONRAIL RD AT CANNON, DE	57.8
BUCKS BRANCH NEAR ATLANTA, DE	42.2
BUCKS BRANCH NEAR WESLEY CHURCH, DE	39.8
FREIDEL PRONG AT BAKER ROAD NEAR ATLANTA, DE	51.5
FREIDEL PRONG AT WESLEY CHURCH RD NEAR CANNON, DE	66.9
GUM BRANCH NEAR OAKLEY, DE	16.7
NANTICOKE RIVER AT GREENWOOD, DE	28.7
NANTICOKE RIVER NEAR BRIDGEVILLE, DE	33.1
TOMS DAM BRANCH NEAR BRIDGEVILLE, DE	28.2
WEST BRANCH NEAR GULLY CAMP, DE	20.4
Stream: Ditch	47.4
FIELD DITCH OUTLET AT WESLEY CHURCH, DE	51.9
GILBERT TRIVITTS DITCH AT CANNON, DE	42.8
“Stream” and “Stream: Ditch”	44.8

The limiting water quality criteria are the freshwater chronic criterion for aluminum, and the freshwater acute criteria for copper and zinc. The zinc criteria is hardness dependent, so effluent and ambient water hardness were considered in calculating limits. In May 2017 the State adopted a new freshwater criteria for copper, the Biotic Ligand Model (BLM). The BLM requires at least 12 months monitoring of 10 parameters to determine the criteria. There is a STORET station (Station 303011) in Savannah Ditch downstream of Outfall 002 at Road 246. Monitoring data for 5 of the 10 BLM parameters was available for

6. STORET parameter code 00900, for Total Hardness as CaCO₃.

this station. The values for the 5 missing parameters were estimated using EPA guidance⁷ for estimating missing BLM parameters. Estimation is based upon both ecoregion and stream order. The portion of Savannah Ditch where Outfall 002 discharges is in ecoregion 63 and since it does not have tributaries, it is categorized under stream order 1-3. The BLM-based criteria was used in the reasonable potential analysis and development of copper limits.

The Table below summarizes the results of the Reasonable Potential Analysis, using the “Updated Values” referenced in Table 6 above.

Table 8 – Reasonable Potential (RP) Analysis											
Pollutant	Highest Values	Month	Max. Effluent Conc. (ppm)	Coeff. of Variation*	Water Quality Std. * (ppm)		WLA (ppm)	Ce as % of WLA	Limit or Monitoring Needed?	Avg. Limit (ppm)	Max. Limit (ppm)
					Fresh Acute	Fresh Chronic					
Aluminum, Total	Highest	Jan-16	2.08	0.6	0.75	0.087	0.091	2293%	Limits	0.07	0.15
	2nd Highest	Mar-14	1.6					1764%	Limits		
	3rd Highest	Oct-15	0.76					838%	Limits		
Copper, Total Dissolved	Highest	Mar-18	0.011	0.9	0.01227	0.00762	0.0079	133%	Limits	0.0052	0.0126
	2nd Highest	July-15	0.0082					99%	Monitoring		
	3rd Highest	Jun-14	0.008					97%	Monitoring		
Zinc, Total Dissolved	Highest	Jun-14	0.072	0.8	0.31	0.31	0.32	22%	Neither	0.14	0.324
	2nd Highest	Oct-13	0.067					18%	Neither		
	3rd Highest	Sep-13	0.057					17%	Neither		
*Calculated from 3 years of monthly Discharge Monitoring Reports (i.e., 36 values), ending Mar, 2018 for copper and zinc and July, 2017 for aluminum.											
**The water quality standards shown are as they apply instream, without dilution.											
***The Waste Load Allocation includes instream dilution affects, and is based on the strictest water quality standard.											

Note that the zinc water quality criteria is for dissolved zinc. RP calculations use effluent monitoring results for total zinc, but conservatively assume that it is 100% dissolved. Even at that, the RP analysis indicates that limits are not warranted for zinc.⁸ RP analysis indicates limits are needed for Aluminum. According to the permittee, recent process changes have been implemented at the facility in order to meet aluminum limits. RP analysis for aluminum therefore did not include the most recent discharge data (Aug 2017-Mar 2018) as it would not result in a good representation of the average discharge data variation (coefficient of variation).

Zinc

The results of the reasonable potential analysis does not indicate the need to monitor zinc; still, the permit requires continued quarterly monitoring for zinc and hardness, considering remaining issues with Whole Effluent Toxicity. The proposed permit deletes the zinc limits, based on the discussion above. Federal⁹ and State¹⁰ regulations have anti-backsliding requirements, but the proposed permit changes do qualify under the exceptions allowed in those regulations.

Copper

Copper toxicity can be highly variable and dependent on ambient water chemistry. The BLM was developed as a tool to account for variations in metal toxicity using local water chemistry. The BLM for

⁷ Draft Technical Support Document: Recommended Estimates for Missing Water Quality Parameters for Application in EPA's Biotic Ligand Model. <https://www.epa.gov/wqc/draft-technical-support-document-recommended-estimates-missing-water-quality-parameters-biotic>.

⁸ Moreover, taking an extra conservative approach of applying “uses” (see discussion above) at the Outfall 002 location, limits are not warranted for copper or zinc.

⁹ 40 CFR 122.44(l), http://www.ecfr.gov/cgi-bin/text-idx?SID=5920e435a64ba708ab8f144209f2458b&mc=true&node=se40.22.122_144&rgn=div8

¹⁰ Delaware RGCWP, <http://regulations.delaware.gov/AdminCode/title7/7000/7200/7201.pdf>

copper requires the following input parameters (in dissolved form) which influence the bioavailability and toxicity of copper to aquatic life; temperature, pH, dissolved organic carbon (DOC), calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), sulfate (SO₄), chloride (Cl), alkalinity and sulfide.

As explained above, the STORET station downstream of Outfall 002 (station 303011) only monitors 5 of the BLM parameters (temperature, pH, DOC, total chloride and total alkalinity) and the remaining 5 were estimated using EPA guidance document. Since the criteria is based on estimates for 5 of the BLM parameters, a special condition has been added in the permit which requires the Permittee to monitor the required BLM parameters for a period of 24 months. The results will be used to develop a criteria which will be used in performing reasonable potential analysis to determine if there is a reasonable potential of the discharge to cause an exceedance of the BLM-based copper criteria. If reasonable potential is found, limits will be determined and the permit shall be reopened to include the new limits. If no reasonable potential is found, the permit shall be reopened to remove the existing limits and only monitoring will be required.

Aluminum

Aluminum sulfate is added in the wastewater treatment process for the removal of phosphorus. The results of the reasonable potential analysis indicate limits are needed for aluminum. The current permit includes aluminum limits.

The August 1, 2006 permit included a compliance schedule for meeting aluminum limits and the permittee had requested an extension to the compliance date. The Department had agreed to issue an extension but since it would not be executed in the August 1, 2006 permit, the Department proposed to issue a "Notice of Conciliation and Secretary's Order", as companion to this permit, which would provide a schedule for the permittee to achieve compliance with the aluminum limits. In a letter date November 16, 2017 the permittee stated that it considered such an Order unnecessary as it was meeting the limits as a result of then recent process changes. The Aluminum limits therefore become effective on the effective day of this permit. The Reasonable Potential Analysis, updated during the permit re-issuance process, still reflects the final aluminum limits as stated in the August 1, 2006 permit are still appropriate (except that the max. limit has been increased slightly, from 0.14 mg/L to 0.15 mg/L).

Whole Effluent Toxicity

The current permit requires chronic biomonitoring but no limit for "Whole Effluent Toxicity" (WET) on 100% effluent, based on the low dilution available in the receiving waters. Perdue's effluent has exhibited recurring intermittent toxicity. The permittee implemented Toxicity Reduction Evaluation (TRE) plan, in June 2017 however did not get beyond Phase 1 of the Toxicity Identification Evaluation (TIE).

Consultation with EPA indicates that Outfall 002 has had recurring intermittent toxicity at least since 1992, but the permittee has never gotten beyond Phase 1 of the 3 phase TIE procedure. The permit includes a new Whole Effluent Toxicity limit of 1.0 TU daily average. The permit can and does provide a schedule of compliance to meet that limit and is consistent with anti-backsliding requirements, because a limit is stricter than just the biomonitoring requirement.

Monitoring Frequency

Except for copper and zinc, all monitoring frequencies have been retained from the current permit.

Table 9 – Proposed Monitoring Frequencies for Outfall 002 Parameters			
Effluent Parameter	Monitoring Requirement		
	Proposed Measurement Frequency	Current Measurement Frequency	Sample Type
Flow	Continuous	Continuous	Recording/Totalizing
BOD ₅	Once per week	Once per week	Composite
Total Suspended Solids	Once per week	Once per week	Composite
Oil and Grease	Once per month	Once per month	Grab/shift
Phosphorus, Total (as P)	Once per week	Once per week	Composite
Ammonia (as N)	Once per week	Once per week	Composite
Nitrogen, Total	Once per week	Once per week	Composite
Aluminum	Once per month	Once per month	Composite
Copper	Once per quarter	Once per month	Composite
Zinc	Once per quarter	Once per month	Composite
Hardness	Once per quarter	Once per month	Composite
Enterococcus	Once per week	Once per week	Grab
pH	Once per day	Once per day	Grab
Biomonitoring	Once per quarter	Once per quarter	Composite

Bases for Effluent Limitations for Outfall 004

The current permit's requirement that the discharge be free from floating solids, sludge deposits, debris, oil, and scum are retained. The permit requires the facility to implement a SWP. The only storm water is sheet runoff from a grassed area. Monitoring requirements are established via the Storm water Plan.

Special Conditions

Special Condition No. 1 indicates this permit supersedes the State Permit WPCC 3235F/74 and NPDES Permit DE 0000469 issued on August 1, 2006.

Special Condition No. 2 is a standard permit reopener clause. This Special Condition allows the Department to reopen and modify the permit if the discharge is causing water quality problems.

Special Condition No. 3 defines sampling requirements for oil & grease for Outfall 002.

Special Condition No. 4 requires quarterly chronic biomonitoring of Outfall 002 at 100% effluent

Special Conditions Nos. 5, 6, and 7 require proper disposal of sludge, in accordance with state and federal regulations under 40 CFR 125.3.

Special Condition No. 8 requires implementation and maintenance of a storm water plan (SWP).

Special Condition No. 9 requires the operator of the wastewater treatment facility to be a certified operator holding a Class IV license.

Special Condition No. 10 outlines the requirements to meet the moving 12-month cumulative load effluent limits for Total N.

Special Condition No. 11 requires the permittee to use EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits pursuant to 40 CFR Part 136.

Special Condition No. 12 requires monitoring of copper BLM parameters and performing reasonable potential analysis for copper.

Antidegradation Statement

Except where otherwise noted herein, the proposed effluent limitations included in this NPDES permit comply with the applicable portions of the State of Delaware Surface Water Quality Standards, Section 5 Antidegradation and ERES Waters Policies.

Public Notice and Process for Reaching a Final Decision

The public notice of the Department's receipt of the application and of reaching the tentative determinations outlined herein will be published in the Wilmington News Journal and the Delaware State News on XXXX XX, XXXX. Interested persons are invited to submit their written views on the draft permit and the tentative determinations made with respect to this NPDES permit application. The Department will not hold a public hearing on this application unless the Department receives a meritorious request to do so or unless the notice of this proposal generates substantial public interest. A public hearing request shall be deemed meritorious if it exhibits a familiarity with the application and a reasoned statement of the permit's probable impact. The request for a public hearing shall be in writing and shall state the nature of the issues to be raised at the hearing. All comments received by 4:30 p.m. on XXXX XX, XXXX will be considered by the Department in preparing the final permit.

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